

Quandong Pan

(He/Him)

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“EMBRACE COMPLEXITY”

- “There is no flood in a single raindrop, no financial crash in a single dollar, and no love in a single carbon atom. Yet, when combined under certain conditions, these simple elements create phenomena far greater and more complex than their individual parts.” — The Science of Complexity

RESEARCH INTERESTS:

- I am driven to understand the **fundamental principles underlying biological processes** like pattern formation, regeneration and multicellularity etc, through employing **experimental and computational techniques**, including scRNA-seq, multi-omics integration, modeling the intricate dynamics of gene regulatory networks and the epigenetic landscape, ultimately seeking to control these systems through the combined power of **systems biology and bioengineering**.

FIELDS OF INTEREST IN GENERAL:

- Systems Biology
- Synthetic Biology & Biotechnology
- Metabolic & Genetic Engineering
- Directed Evolution and Optimization of Microorganisms
- Evolutionary Developmental Biology
- Regeneration and Morphogenesis
- Organoids, Biofilms and Multicellularity
- Self-Organization and Emergence
- Multiscale Analysis of Cellular Systems
- Network Science and Complex Systems Modeling
- Attractor Landscape Analysis of GRNs

EDUCATION

Bachelor of Science – Major: Life Sciences

University of Freiburg

Oct 2022 — Present

<https://uni-freiburg.de/ucf/las/curriculum/#life-sciences>

RELEVANT COURSEWORK

- Cell Biology
- Basic Chemistry and Biochemistry
- Genetics and Epigenetics
- Data Science with R
- Computational Genomics
- Human Cognition and Artificial Intelligence
- Engineering with Living Materials

RESEARCH EXPERIENCE

Research Internship — The Bonasio Lab

University Hospital Freiburg

<https://www.bonasiolab.org/#top>

[03/04/2024 – 30/04/2024]

The lab focuses on the molecular mechanisms of epigenetic memory, particularly interested in elucidating the epigenetic mechanisms of caste transition and reversion in *Harpegnathos saltator* ant:

- My role was primarily focused on conducting behavioral analysis of the *Harpegnathos saltator* ant colony during its transition phase induced by colony separation.

Research Internship — Molecular Biology of Archaea

University of Freiburg

<https://www.archaellum.org/research>

[Sep 2025-Present]

- The lab focuses on understanding the biogenesis of the archaeal cell envelope including processes like N-glycosylation, the assembly of macromolecular structures like pili and the archaellum, and cell division and regulatory processes depending on protein phosphorylation.

- I am trained on but not limited to cloning, sulfoobus genetics, phenotypical analysis, microscopy, motility assays, nucleotides isolation, biochemistry, overexpression in E. coli, protein purification etc.

CONFERENCES

- Horizons in Molecular Biology Symposium 2025 in Göttingen
 - [08/09/2025 – 11/09/2025] Max Planck Institute for Multidisciplinary Sciences
 - Biochemistry and Molecular Biology, Cell Biology
 - Genome Biology, Developmental Biology
 - Structural Biology, Molecular Neuroscience, Computational Biology
 - Link: <https://www.mpinat.mpg.de/horizons>
- Life Sciences Annual Meeting 2024 in Switzerland
 - [13/02/2024 – 15/02/2024] University of Lausanne
 - Bioinformatics, Biophysics, Cardiovascular Biology & Physiology
 - Experimental Pharmacology, Ion Channels and Membrane Transporters Microscopy
 - Molecular and Cellular Biosciences, Proteomics and Systems Biology
 - Link: <https://annual-meeting.ls2.ch/2024/program>
- SY-Stem Cell Conference 2024 in Vienna
 - [13/03/2024 – 15/03/2024] Vienna BioCenter, Austria
 - Early Embryogenesis
 - Neural lineage specification
 - Nervous Systems Development
 - Brain Disease, Regeneration and Novel Technologies
 - Link: <https://www.oeaw.ac.at/imba/seminars-events/past-events/sy-stem-2024>
- Interdisciplinary College 2024 of Complex Systems in Germany:
 - [01/03/2024 – 08/03/2024]
 - Computational Neuroscience, Machine Learning, Game theory
 - Theoretical Biology and Complex Dynamical Systems Simulation
 - Link: <https://interdisciplinary-college.org/program/>

SKILLS

- Programming Language:
 - R Language
 - MATLAB and Python
- Software and Platform: R Studio, MATLAB, Github, NetLogo
- Basic Skills in Molecular and Experimental Biology

LANGUAGE PROFICIENCY

- Chinese (Native)
- English
 - IELTS (Scale of 9)
 - (Overall 7.0, Listening 7.0, Reading 7.5, Speaking, 7.5, Writing 6.5)

- PTE Academic (Scale of 90)

- (Overall 86, Listening 80, Reading 90, Speaking, 72, Writing 90)

- German B2